

REMARKS**CLAIM OBJECTIONS AND REJECTIONS**

With respect to **Paragraph 1** of the Final Office Action, the Examiner presents a passage from 35 USC 103(a). No response from the applicant is believed to be expected or required.

With respect to **Paragraph 2** of the Final Office Action, Claims 1-7, 9-16 and 22 stand as rejected under 35 USC 103(a) as being unpatentable over Byrne (USPN 4,330,729) in view of Nakagawa (USPN 4,430,529). It is said that Byrne teaches mounting devices that are constructed of insulating material and positioned at the top and bottom of the metal diaphragm. It is further said that Byrne does not specifically teach mounting with adhesive, but that it is very well known in the art to provide an adhesive for fixing or connecting the mounting devices to the diaphragm.

In reply, and as an initial matter, the applicant reiterates the arguments set out previously in his response to the previous Office Action mailed August 2, 2004. More specifically, the applicant incorporates by reference the Office Action Response of 8/2/04 into the instant paper as if fully set out at this point.

1. **The cited references do not contain a *single* example of a piezoelectric device that is mounted on a nodal ring by using an adhesive on *both* sides of the device.**

Applicant has searched the cited references but cannot find that the Examiner has provided a single example wherein glue is used on *both* sides of a piezoelectric element to mount it and, more particularly, to mount it via adhesives that have been placed along a nodal ring. It is,

of course, old and well known to use a mounting adhesive on *one* side of a bender. However, applicant's invention comprises a diaphragm that is supported on *both* sides through the use of an adhesive and the Examiner has failed to cite a single instance in the prior art where another has done that.

For example, the Examiner offers Nakagawa at col. 3, lines 29-31 and col. 4, lines 42-44 as support for the use of adhesive for connecting the mounting device to the diaphragm. However, both of the cited passages refer to piezoelectric devices that use adhesives on a *single* side. The Nakagawa specification at col. 3, lines 29-31 is concerned with the embodiment of Figure 5, which shows support (and adhesive) for the piezoelectric diaphragm on a single side. Similarly, the text at col. 4, lines 42-44 refers to the use of adhesive on a *single* side (emphasis added):

In a fifth embodiment in FIG. 8, the piezoelectric diaphragm 12 is kept stuck by adhesive or pressurized by protuberance 14a at its central portion only from one side, which corresponds to the embodiment in FIG. 6 from which the frame 13 and elastic body 21 are omitted, where the diaphragm 11 is fixed to the edge of frame 14.

Adhesives are used in this single-sided embodiment (i.e., only a single central protuberance is used) to hold the diaphragm immobile at a point not on the nodal ring with adhesive applied on only one side.

Of course, Nakagawa's Figure 6 embodiment – which has tapered support protuberances 13a and 14a on both sides of the piezoelectric element – does not utilize adhesive to attach those protuberances to either side of the bender. Further, although the specification does discuss the use of adhesive to affix the elastic bodies 21 and 22 to the upper and lower surfaces of the diaphragm (e.g., col. 3, lines 59-66), there is no mention of further affixing them to the protuberances. Indeed, the application makes it clear that in this embodiment the adhesive

is optional and an variation is presented in which the elastic bodies 21 and 22 are held in place by tension alone (col. 4, lines 24-28), i.e., without any sort of adhesive.

Finally, it should be noted that Nakagawa does not use adhesive at the center of the piezoelectric device so much for *support* but rather to keep the center of the diaphragm vibration free, thereby altering its acoustic properties. See, for example, the discussion in connection with Figure 5 wherein the inventor explains: "The central portion of diaphragm 11 is fixed substantially at a point to the tip of support 17 by the adhesive, thereby being kept stationary." Col. 3, lines 29-31. The actual mounting support for this device occurs at its perimeter – not at a nodal ring – where the specification indicates that adhesive may optionally be used to affix the bender to its mounting frame.

Turning next to the *Byrne* reference, the applicant reiterates that there is no teaching or suggestion in *Byrne* that a piezoelectric device might be mounted on a nodal ring by using adhesive on both sides. *Byrne* (col. 1, lines 35-37) suggests what is already well known in the art: a diaphragm may be attached to a support member at its nodal ring by using rubber-like cement. *Byrne* mentions – and discourages the use of – adhesives in this passage and never again thereafter. Consider, for example, *Byrne*'s aversion to gluing ("In many instances, the diaphragm is attached to the support member by a rubber-like cement which requires a period of time for curing") at column 1, lines 35-37, emphasis added. Of course, the time required to apply and cure an adhesive would be antithetical to *Byrne*'s stated goal of providing "an improved piezoelectric transducer assembly that can be rapidly and easily assembled . . .", column 2, lines 2-3, emphasis added.

Finally, and although this reference was not specifically cited in the Final Office Action responded to herein, a brief discussion of *Pipitone et al.* (USPN 4,063,049), which was

cited previously by the Examiner, is warranted. More particularly, Pipitone contains no mention whatsoever of adhesive, glue, or cement in its specification or claims, although it does mention mounting on an annular – not a nodal – ring. Pipitone suggests the use of a “resilient clamping ring” (col. I, line 19), but never an adhesive.

Further, Pipitone teaches the construction of a microphone apparatus (rather than a speaker) that relies on an electrical connection between conductive element 11 and metal foil 8, which electrical connection would likely be compromised if adhesive were used to bond the two components together. Thus, adding adhesive to Pipitone’s invention would likely render it inoperable for the purposes intended.

Finally, it should be noted that a microphone should be a non-resonant device and Pipitone’s mounting of the bender at a location other than along its nodal ring tends to reduce its resonance peaks, thus broad banding the resulting assembly. The mounting method employed by Pipitone is designed to detune the bender, which is the antithesis of what the instant patent application teaches, for example, at page 6, lines 3-8:

The nodal fulcrums are useful points by which the bender 100 can be mounted. Mounting at these points is beneficial for acoustic generating devices due to the limited attenuation that occurs, thereby allowing the device to function acoustically at an optimal level. Mounting at other points along the bender 100 tends to damp the vibration, thereby decreasing the sound generation capability of the device.

Thus, there is no teaching or suggestion in the prior art that a piezoelectric device might be mounted on a nodal ring by using an adhesive on *both* sides of the device, as has been suggested by the applicant.

2. The Examiner has combined a reference that teaches the use of adhesive on a single side of a piezoelectric device at a non-nodal location (Nakagawa) with a reference that teaches clamping the piezoelectric device on a nodal ring (Byrne) to reject applicant's invention.

Nakagawa "mounts" (actually, the term "restrains" would be more appropriate) a piezoelectric device at its center, thereby changing the resonance properties of the device. The center of the piezoelectric device is *not* a nodal point as that term is used herein (compare Nakagawa Figures 2 and 4). As is discussed *supra*, there is no teaching or suggestion in Nakagawa that adhesive could be applied to both sides of such a device.

Byrne discourages the use of adhesives (see, e.g., col. 1, lines 35-38). Further, Byrne's mounting of the diaphragm along a nodal curve via mechanical means can only result in an alteration of the sonic properties of the device (e.g., the diaphragm is clamped in place, thereby inevitably stressing it and broadening the effective dimensions of the nodal ring beyond its actual dimensions).

Although Byrne mentions gluing a diaphragm along a nodal ring (col. 1, lines 29-37), that reference never once indicates that such glue might be placed on *both* sides of the diaphragm, as is done with applicant's invention. In fact, gluing is listed as a problem for which Byrne's disclosed invention is offered as a solution.

Finally, in the Final Office Action at Paragraph 3, the Examiner indicates that he has not combined the Nakagawa reference with the Byrne reference to modify its structure, but rather Nakagawa has merely been cited to provide an example of the use of "an adhesive for securing the diaphragm to a support surface of a piezoelectric loudspeaker." Final Office Action at Page 3.

In reply, applicant finds this comment somewhat puzzling in view of the fact that Byrne itself includes a reference to the use of adhesive to affix a diaphragm to a support surface (albeit on a single side). Thus, applicant would argue that the Nakagawa reference provides nothing beyond Byrne and, of course, neither reference – either individually or in combination – teaches the applicant's particular invention.

3. The prior art teaches away from applicant's invention.

As was discussed previously, Byrne discourages the use of adhesives (see, e.g., col. 1, lines 35-38). The U.S. Supreme Court, in commenting on rejections under Section 103, said in *United States v. Adams*, 383 U.S. 39, 52 (1966):

We do say, however, that known disadvantages in old devices which would naturally discourage the search for new inventions may be taken into account in determining obviousness.

With respect to the instant application, the known (to Byrne) disadvantage of gluing a piezoelectric device along a nodal ring should have been taken into account in any obviousness determination. Applicant believes that this aspect of Byrne was not properly considered and, if it had been, the instant claims would have been allowed.

4. There is no teaching or suggestion in the prior art that a piezoelectric device might be mounted by using glue on both sides along a nodal ring.

There is no mention in any case relied upon that a piezoelectric device might be mounted on both sides along a nodal ring using adhesive. In every case cited by the Examiner, the reference merely mentions or utilizes the well-known practice of mounting a piezoelectric

device by placing an adhesive on only one side or, alternatively in those instances where the diaphragm is mounted from *both* sides, a physical mounting method (e.g., clamping, etc.) is used.

Thus, the Examiner has failed to provide any motivation or suggestion *in the prior art* for the modification to Byrne (and/or Nakagawa) that is relied upon by the Examiner and that is said to yield the instant invention.

5. The instant rejection under Section 103(a) is improper and should be withdrawn.

In view of the foregoing it is believed that the instant rejection should be withdrawn and this case passed to issue. First, and as has been described above, applicant believes that there is no teaching or suggestion in the prior art that a piezoelectric device might be mounted on a nodal ring via adhesive on both sides. As such, applicant believes that the instant rejection is improper. Recall the words of the Federal Circuit:

The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.

In re Fritch, 23 USPQ 2d 1780, 1783-84 (Fed. Cir. 1992).

Finally, the applicant believes that the Examiner has improperly engaged in hindsight reconstruction of the applicant's invention and, for that reason, the instant rejection should be withdrawn. Recall, that no reference of record in this case discloses the use of adhesive on both sides of a piezoelectric diaphragm, wherein the adhesive is applied along a nodal ring. That fact pattern brings to mind the words of the Federal Circuit in *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 220 USPQ 303, 312-13 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984):

To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that

knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.

Applicant believes that, in rejecting the instant claims based on the references that are of record, the Examiner has failed to heed the words of the Federal Circuit in this regard.

* * *

As a consequence, applicant requests withdrawal of the instant rejection so that this case may be passed to issue.

With respect to **Paragraph 3** ("Response to Arguments"), the Examiner indicates that applicant's arguments have been considered but not found to be persuasive. The Examiner further indicates that Nakagawa has not been selected to modify the structure of the Byrne loudspeaker (page 3 of the Final Office Action) but rather to provide an example of the use of an adhesive for securing the diaphragm of a piezoelectric device to a support surface.

Applicant discussed this statement previously in connection with the last two paragraphs of Point #2 above.

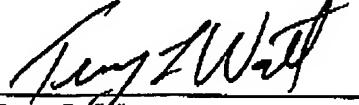
With respect to **Paragraph 4**, the Examiner indicates that this office action has been made final.

In reply, applicant has filed the instant paper within two months of the date of the Final Office Action.

Finally with respect to Paragraph 5, no response on the part of the applicant is believed to be necessary.

Respectfully Submitted,

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Date



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